THE PREVENTION OF FÆCAL FISTULA AFTER APPENDECTOMY

SIMPLE LIGATION VS. PRECARIOUS PURSE-STRING

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"Fewer errors occur in simple manipulative processes than in those of complex nature. The more we omit the multiplicity of detail and bring surgical technic down to an irreducible minimum of simplicity, the greater will be our reward in the ease and number of recoveries. * * * The easier the method, consistent with security, the sounder its qualifications."—Royster.

"The workman who does his work in as simple a way as possible usually does the best job. * * * Cumbersome, complicated ways of doing things are not allowable in the development of the art of performing surgical operations."—E. Starr Judd.

"The surgeon must seek always and earnestly for simpler methods and a better way. In the craft of surgery the master word is simplicity."—Moynihan.

Recently attention has been called by several medical writers to the general increase in the mortality of surgical operations, particularly appendectomy. One explanation which has been offered of this general increase is that quite generally throughout the country untrained physicians, though *legally* qualified, are undertaking to do major surgery. Prominent surgeons have discussed the matter, and there have been some suggestions of action by the American Medical Association, but nothing has developed and the profession in general seems quite apathetic. Legislation requiring a second examination of all doctors desiring to pose as specialists, so that those qualified for the specialty would be registered, would certainly aid materially in reducing the present death-rate following surgical procedures. However, the mortality of appendectomy cannot be entirely attributed to the inexpertness and poor judgment of amateurs, since a good many surgeons believe that it is in no small part due to the inherent dangers of a certain rather common method of operating.

The method referred to is the one usually known as the "purse-string," in which (1) the meso-appendix is detached from the appendix; (2) the base of the appendix (previously crushed in the technic of some operators) ligated with catgut or silk; (3) the appendix cut away about one-fourth of an inch beyond the ligature, by knife, scissors, or electric cautery; (4) the mucous lining of the stump of the appendix cauterized by carbolic acid or the tip of an electric cautery point, or the mucous membrane removed by a little scoop; (5) a purse-string suture, usually of six or eight stitches, inserted around the stump; (6) the stump depressed and (7) the suture tightly tied.

In looking through the different text-books, all authors are found to mention the purse-string method, and some of them seem to distinctly favor it. Thus, in Lewis' "Practice of Surgery" the chapter on "Appendi-

citis," as re-written for insertion in July, 1931, describes no other method but assures the reader that this method is "simple and safe."

Among the dangers of the purse-string technic is that its use necessarily cuts off a part of the blood supply to the area encircled. I once entered an operating room just as the operating surgeon had brought into view the cæcum from which he had removed an appendix by the purse-string method some three or four days before; the child had done well until a few hours before, when suddenly it went into collapse with great pain. *The encircled bit of cæcal wall had simply dropped out,* and the fæcal contents were pouring into the peritoneal cavity through an opening through which one could easily thrust a finger. The child was dying. Within a very few weeks I was told of two other cases of similar slough.

Harris,[1] of San Francisco, reports a case in which, at the time of the placing of the purse-string, the operator noticed that he had pricked a small vessel which caused a hæmatoma in the wall of the cæcum, but this seemed to be controlled before he closed the abdomen. The patient seemed to do well for three days, but then complained of pain with evidence of internal hæmorrhage; on opening the abdomen a large amount of free blood was found and the entire wall of the cæcum necrotic. The patient promptly expired.

Roeder,[2] of Omaha, found that of one hundred appendectomies made with the purse-string suture, 88 per cent. of the needles and remaining pieces of suture gave positive growths on culture media, proving clearly that the needle had penetrated one or more times the mucous membrane of the cæcum. He also called attention to the added danger when the base of the appendix is crushed, since his laboratory investigation had shown that the crushing clamp was found to be frequently contaminated by the infectious material forced to the surface by the crushing process. Furthermore, the ligature which is placed in this crushed groove is not only in an infected field but in devitalized tissue very likely to give way from internal pressure, conditions very different from those described and illustrated by Seelig.

Horsley[3] calls attention to the perfect incubation chamber furnished by the purse-string enclosing the depressed stump, as presenting "first, the diminution of the blood supply to the tissues * * *; second, the presence of necrotic material; and third, the formation of a closed sac";—all perfect conditions for abscess formation!

All authorities agree that the wall of the cæcum is the thinnest part of the entire alimentary canal and that the contents of the cæcum are the most highly infected. No author being found who gave the exact thickness, studies instituted at my request by physicians making frequent autopsies showed its thickness to be only *one-sixteenth of an inch.* The wall consists of four layers, the peritoneal, muscular, submucous and mucous. It would seem to be clearly an absolute impossibility for any man to put in the usual purse-string suture without running the gravest possible risk of penetrating infected tissue, so that his suture material would almost certainly become infected, as shown by the experiments of Roeder! Indeed, Roeder informs me that he has found the wall of the cæcum one-half inch from the base of the appendix, where the purse-string is usually placed, only *one-thirty-second* of an inch thick!

A number of surgeons sever the appendix with the electric cautery; this

would certainly sterilize the surface actually touched by the cautery, but, as shown by Roeder, the tip of the cautery, if used to destroy the lining of the funnel of the appendiceal stump, does not always reach deeply enough to sterilize, and in this respect is greatly inferior to carbolic acid.

Hamilton Bailey,[16] of London, in his recent work on "Emergency Surgery" fully describes his appendectomy technic, which is that of the purse-string, but directs that the stump be "wiped with a gauze swab," and then proceeds, without further sterilization, to bury it in the incubation chamber.

Babcock[4] seems to trust entirely for sterilization of the stump to severing it with the actual cautery. As to the purse-string he adds: "Purse-string, occluding, or enfolding sutures in the cæcum, after removal of an infected appendix, are unnecessary and harmful, favoring large sloughs in the head of the cæcum."

The one-sixteenth, or less, of an inch space in which the surgeon must insert his purse-string has always reminded me, and I think very appropriately, of the theological plight of Charles Wesley, as shown by a verse in one of his well-known hymns:

> "Lo! on a narrow neck of land,
> 'Twixt two unbounded seas, I stand,
> Secure, insensible:
> A point of time, a moment's space,
> Removes me to that heavenly place,
> Or shuts me up in hell."

The surgeon who undertakes to insert a suture in tissue one-sixteenth of an inch thick may possibly feel "secure," if not "insensible," but if the patient knew the narrow straight between sterility and infection—between safety and peritonitis—he would certainly feel very far from either "secure" or "insensible." Would any patient select a technic which gives from 1.4 per cent. to 18 per cent. of fæcal fistulas about one-half of them necessitating a second operation, in preference to a method giving only one such fistula in many thousand operations?

Fæcal Fistula.—First place among the unfortunate "sequelæ" of appendectomy, is given to "fæcal fistula" by Royster[5] in his work on "Appendectomy." Howard A. Kelly[6] quotes five surgeons as having respectively 3.5 per cent., 5 per cent., 4 per cent., 18 per cent. and 6.6 per cent. of fæcal fistulas. Deaves[8] reported 4.8 per cent. Pfeifer and O'Connell[7] report 1.4 per cent., based on over 3,000 cases.

What particularly attracted my attention to the dangers of the purse-string was this large percentage of fæcal fistulas reported by surgeons who used that method. I could not recall a single one of my own cases in which I had met with any such complication, and this led me to go through my entire files, with the result that I found but one case in which anything like such a sequel appeared though I had operated on quite a number of such fistulas in which the primary operation had been made by a previous op-

erator. The absence of such a complication in my own work seemed to me could only be explained by the difference in technic.

Noting the reports of increased mortality of appendectomy and of this frequency of fæcal fistulas, I reviewed my own records and found that up to July 1, 1931, I had made 10,353 appendectomies. Of the earlier ones some were made by excision of the base with closure by a double row of sutures, or by the inversion method of Edebohls, but the great bulk were made by the method of Seelig,[14] *viz.*, ligation, amputation, carbolization, and dropping. I always had a feeling that the purse-string suture was a dangerous proposition, and therefore could never bring myself to employ it because of what I thought were its inherent dangers. With very few exceptions, as in cases which were operated upon at distant homes or in hospitals outside of Columbus, all of these patients, without regard to social or financial status, were carefully studied by me before operation and in the after-treatment were seen by me once or twice each day; of each case I have quite full typewritten histories. These cases, therefore, are in distinct contrast to many hospital cases which are seen by the operator only at the time of operation.

During all these years I have had a salaried first assistant, and in going over these statistics I supplemented the information thus obtained by a personal communication with each one of these assistants, not one of whom could recall a single case of post-operative fæcal fistula, except as stated. That one case occurred in a man sixty-four years of age, with a gangrenous appendix; parts locally otherwise in good shape, and no drainage was placed. He promptly developed a superficial infection in the fat of the abdominal wall, which discharged and after a few days extended inward, in two weeks resulting in a fæcal discharge. In due time this drainage ceased of itself, but there still persisted a purulent sinus which annoyed him so that six months later it was dissected out; the removal of the sinus, which had developed a distinct lining, ended his whole trouble and he is now, ten years later, still alive and well.

Taking for illustrative purposes the year in which the number of appendectomies was the largest, 141 were made primarily for appendicitis, and 392 incidentally in connection with other operations; eighteen were made for simple acute appendicitis; sixty-seven for chronic or subacute appendicitis; forty-five for gangrenous appendicitis (fourteen of them requiring drainage); eleven for abscessed cases. The deaths were:

(1) Boy, aged sixteen, operated upon on the sixth day at his home; condition bad and prognosis almost hopeless. General purulent peritonitis found as feared, and the appendix found free in the pus. Free drainage, but death in a few hours. (2) Woman, aged forty-three, in bad shape for four days. General purulent peritonitis; appendix thoroughly rotten. Free drainage; bad prognosis; death in a few hours. (3) Male, age forty. Usual symptoms of appendicitis for one week, but had been treated for "colitis." *Repeated chills.* Very large retrocæcal abscess; free drainage. Continued symptoms of pylephlebitis, and death from exhaustion in five weeks. (4) Chinaman, aged fifty-eight; sick five days. Had been freely purged. Extensive peritonitis; rotten

retrocæcal appendix with two concretions; free drainage; died the next day. (5) Male, aged thirty-six; had had several previous attacks but had refused operation; in bad shape. Gangrenous appendix back of the cæcum with much local infection. Died one week later of general peritonitis.

Physicians who may have been led to question the existence of such an entity as chronic appendicitis should read the discussions on that subject by the late John B. Deaver,[8] the distinguished Philadelphia surgeon, and the more recent article by Roy D. McClure,[9] Chief Surgeon to the Henry Ford Hospital of Detroit.

That the use of the purse-string is not followed by a prohibitive mortality can only be attributed to the powers of the peritoneum to take care of any reasonable amount of infection; but there is necessarily a limit to those powers, and to surgeons who have used the simpler technic the dangers of the more complicated method seem so great as to render its employment entirely beyond the pale of safety.

All surgeons will admit that the purse-string method presents a very pretty appearance, and from the outside looks very surgical; but when one considers what may be going on below the purse-string he might readily think of the "whited sepulchers" of St. Matthew, "beautiful outward, but within, full of uncleanness."

One cannot but consider, in these cases of fæcal fistula, that the occurrence of the fistula probably saved the patient's life, since otherwise death would have resulted from the extension of the infection in other directions; and there would seem to be no question as to infection, coming from some of the needle punctures of the cæcal wall, being responsible for many deaths which have been credited to "peritonitis." Moynihan's[10] "N" suture is a trifle safer than the usual purse-string, since it requires but four instead of the usual six or eight stitches, but as he crushes the appendix with a Doyen clamp before ligating he increases the danger.

Bailey,[16] of London, in writing on fæcal fistulas quotes approvingly an aphorism of a former colleague of his: "If a patient with peritonitis develops a fæcal fistula, he does not die"; his explanation being, of course, that a fæcal fistula acts as an enterostomy. In a considerable number of cases I have been called in consultation when the patient's condition after operation was hopeless; general peritonitis was present in all of them, and inquiry showed that the purse-string had been used in each of these cases. A number of years ago Dr. Robert T. Morris, of New York, published an article detailing his technic, which was the same as Seelig's. Recently in response to a letter of inquiry as to fæcal fistulas, he replied that he *had had none since he adopted that method.*

Perhaps the lack of fæcal fistulas in my records may be due in part to the fact that if the base of the appendix is involved with some infiltration of the adjacent wall of the cæcum, the involved portion of cæcum is removed by an elliptical excision and the opening closed with a double row of catgut stitches. Repeatedly interns or nurses have anxiously reported

the presence of a fæcal fistula, but examination has shown a simple colon bacillus infection in the superficial fat which promptly cleared up; the intern having trusted to the odor in making his diagnosis. It is reasonable to suspect that surgeons who have reported numerous fæcal fistulas have likely trusted to such statements of the attending nurse or intern without making a personal examination.

As it might very properly be said that statistics based in part on the routine removal of the appendix when operations were made for other conditions, would hardly be a fair criterion as to the appearance of fæcal fistula, it may be well to state that my records show that 3,215 operations were made for appendicitis; so that, according to the best published statistics available, there should have occurred at least thirty-five or forty fæcal fistulas.

The chief objections to the purse-string treatment are: (1) It requires much more time; (2) it necessitates more mobilization of the cæcum; (3) there is very great danger (88 per cent. according to Roeder) of the needle penetrating the bowel with resulting peritonitis; (4) distinct danger of a hæmatoma from pricking a vessel; (5) danger of necrosis of the encircled wall of the cæcum from diminished blood supply; (6) great increase of post-operative adhesions, with resulting post-operative ileus; (7) greatly increased danger of fæcal fistulas; (8) the constant menace from burying the necrotic stump in a perfect incubation chamber.

By correspondence and by reference to surgical literature I find that the purse-string method is condemned by many surgeons of large experience, most of whom are professors of surgery in medical colleges, and all are men of national and international reputation, so that their opinions are certainly entitled to grave consideration.

The simple drop method which was in vogue at Mt. Sinai Hospital when Seelig wrote his article condemning the purse-string, I am assured by one of the staff, is still in use by its twenty surgeons, and Berg, of that hospital, writes me that "it has been the method of choice there for the last forty years. I have used it in thousands of cases and have never known a fæcal fistula to develop after its use. The procedure is surely the simplest procedure that can be employed. The method is speedy and safe."

The Safer Incision.—When McBurney brought out his incision for appendectomy it seemed so satisfactory anatomically that I at once adopted it and used it for a considerable time, and even occasionally resort to it now; but I found in so many cases that the space afforded was so small, and the different methods suggested to enlarge this space so unsatisfactory, that I abandoned it as a routine and adopted instead the method advocated by Deaver and others, by which a straight longitudinal incision is made through the right rectus muscle, the point of making the incision being determined by the anticipated underlying conditions. This incision can be enlarged in either direction, and the surgeon is at once master of the entire situation, while the closing of the incision is a straight piece of work. Some writers have objected to it as requiring numerous ligatures, but no ligatures are

necessary except when the deep epigastric has to be cut, when a single ligature is sufficient; other bleeding points are simply caught by a hæmostat for a few moments and bleeding always stops. I have never had any trouble with paralysis of the muscle from interference with its nerve supply. Surgeons who still favor the McBurney incision should read the article by Southam,[11] who condemns that incision because of the marked frequency with which an inguinal hernia develops after its use.

I am very certain that in scores of cases I have been able to coax a thoroughly gangrenous and tense appendix out through a right rectus incision which would unquestionably have burst had I undertaken to bring it out through a McBurney incision. Such successful removal makes all the difference between complete closure and drainage with its dangers.

Routine Appendectomy.—For many years I have advised and practiced the routine removal of the appendix in all cases in which the abdomen was opened, except when it might be found apparently normal in adults, or the condition of the patient such as to preclude any further operative procedure, no matter how simple. In 1903, I published a short paper[12] advising such removal, in which I reported 636 such cases, together with the conditions found at removal. In looking through my notes of the thousands of cases operated upon since then, I find practically the same relative proportion of the conditions thus found, except that in two or three cases I noted that the appendix was full of pus. *In not a single case was there the slightest evidence of complication following removal of the appendix, nor that its removal had been responsible in any way for any fatal issue.* The following conditions were present in the 636 cases: Thickened, 126; adherent to intestines, 90; to gall-bladder, 4; to omentum, 3; to ovary, 30; to fallopian tube, 36; partly obliterated, 65; club-shaped, 63; constricted, 22; thickened and swollen, 116; containing fæcal concretions, 13 (3 concretions in one case, 5 in another, and a seed in a third); cystic, 2; twisted upon itself, 23; atrophied throughout, 15; apparently normal, 27.

While surgeons in general seem fully to appreciate the wisdom of routine examinations of the appendix, there are still a few who advise against it and themselves ignore it, or if they incidentally examine are very loath to remove it. If such surgeons use a complicated method of removal their attitude is probably wise, but if they employ a simple method it is doubtless wrong.

Many years ago I operated on a man for a pistol wound of the stomach, both walls being perforated. I carefully closed both openings, but because of his bad condition did not examine the appendix. In a few days unfavorable symptoms developed, which I attributed to a leaking stitch; but the autopsy showed the field of operation in perfect shape and death to have been due to peritonitis from a gangrenous appendix. The patient was insane, so that his death, while no calamity, afforded a valuable lesson.

Soon after this a babe, seventy minutes old, was brought to me with a hernia into the umbilical cord. The intestines could be readily seen through the amnion, and at one point was a discharging sinus which I assumed was probably a Meckel's diverticulum, and such was found to be the case at operation. The diverticulum was removed

after the usual appendectomy technic, the abdominal opening closed in the usual way and the babe at once taken home. It continued to cry, except when asleep, from the time it was born until its death on the third day after operation. Autopsy showed a perfect peritoneum; the stump of the diverticulum had disappeared and the surface at that point was completely peritonealized; not an adhesion was present. Conditions were not favorable for a thorough autopsy to find the cause of death. It was, however, a perfect demonstration of nature's method of caring for such stumps.

Operative Technic.—The right rectus incision is rapidly made. If the intestines crowd into the incision they can easily be pressed back and to the left by inserting *moist* gauze sponges, making a coffer-dam if pus is suspected. Usually the appendix is readily exposed, but if it is not it can be quickly found by the following manœuvre: The assistant, standing on the left of the table, holds the cæcum, which has been brought out, with his right thumb and forefinger, and the lower end of the ileum with his left thumb and finger: just below the junction of the two the appendix, no matter if subperitoneal or how thoroughly covered by adhesions, will at once be found, and can be reached by separating overlying tissues with the handle of the scalpel. This use of the scalpel almost invariably exposes the appendix at its very origin, so that its subsequent removal is easy. This manœuvre is especially valuable in cases in which from extensive adhesions the longitudinal bands cannot be readily identified. (The relationship of the appendix to the cæcum and ileum may be compared to that of the genitals of a baby to its legs when the nurse holds the latter abducted and drawn up.)

The meso-appendix is ligated by transfixing it with a hæmostat and withdrawing a chromic catgut ligature. (Usually a single ligation is all that is necessary.) The meso-appendix should be ligated and detached as close to the base of the appendix as possible, so as to leave a minimum of stump with resulting minimum of possible adhesions. The appendix, with the remains of the meso-appendix attached, is brought up and ligated *tightly* with chromicized catgut No. 2 at its very base, so as to get below Gerlach's valve. Holding the ends of the ligature between the thumb and forefinger, the finger close to the knot, with the tissues below properly protected, a hæmostat is placed on the appendix a little above the ligature and the appendix cut away with knife or scissors, leaving a "button" of three- or four-sixteenths of an inch. With a probe dipped in pure phenol the edges of the appendix stump, and its funnel-shaped cavity lined with mucous membrane, are thoroughly touched, *being careful that the phenol reaches the very bottom of the funnel.* Any surplus phenol is wiped off, but the application of alcohol, as recommended by some who evidently are ignorant of the investigations made at the Johns Hopkins,[13] is entirely superfluous. The ligature is then cut short, and the stump of the appendix dropped. One-eighth to one-quarter of an inch has been left as a "button" to support the ligature.

The stump, thus dropped, and also that of the meso-appendix, almost invariably disappear from view, but if either projects so as to be a possible

point for adhesions it can easily be covered by a stitch or two so placed as by no possibility to penetrate the bowel.

The gauze sponges are then withdrawn, the omentum pulled down and spread out smoothly, and the incision closed by a continuous chromic catgut suture embracing the transversalis fascia and peritoneum, carefully turning the edges outward so that there will be no raw surface next to the underlying parts; with the same suture a running stitch is carried back approximating lightly the edges of the split rectus muscle, and then, still with the same suture, the aponeurosis of the external oblique is carefully approximated; several silkworm gut stay sutures are then placed, embracing all the tissues down to and including most or all of the thickness of the rectus muscle. These stitches being tied, all dead spaces are obliterated into which otherwise blood might ooze with a resulting hæmatoma. The edges of the skin are finally approximated by a running chromic catgut stitch and the usual protective dressing applied. ("Clips" are used by some operators, but they interfere with the dressings and increase discomfort.)

Drainage—Before closing the incision, if drainage is necessary, it should be made as a rule by a stab incision well over to the right, its best location being determined by a couple of fingers on the inside. The skin is incised for about one inch and a pair of scissors thrust through and opened. A hæmostat passed alongside the scissors withdraws the ends of any ligatures which have been used and which have been purposely left long, and then withdraws the drain; the distal end of this drain being placed in the infected pocket from which the appendix has been withdrawn, but not in such contact with the stump of the appendix as to increase the danger of necrosis; if the infection extends into the pelvis, the drain should be carried down to the bottom of the pelvis, but great care should be taken to so place it that, if possible, as is almost invariably the case, it is not in contact with the small intestines, but is protected by the ascending colon, the cæcum, or perhaps the sigmoid, or by the omentum pulled down and if necessary held in place by a catgut stitch. In this way post-operative adhesions will be avoided and post-operative ileus. Sufficient drainage can almost always be secured by a single cigaret drain, passed to the bottom of the pelvis if necessary; but in rare cases a soft rubber tube wrapped in gauze and with a wisp of gauze on the inside is preferable. Great care should be taken that there is no pressure upon the intestine from such a drain, since pressure interferes with the blood supply and may precipitate necrosis. (In neglected cases with extensive involvement of everything, wide drainage may be the only salvation of the patient, who must then run the risk of post-operative hernia, fæcal fistula and intestinal obstruction.) With such a drain in place, to be removed usually in two or three days or at the end of a week as the surgeon deems wise, the main incision can be closed completely and the danger of hernia thus minimized. If the sides of the main incision have been contaminated by contact with the gangrenous appendix or by discharge from the inside, the application of dilute tincture of iodine to the incision, after closing the

peritoneum and transversalis fascia to protect the abdominal cavity, will diminish the risk of local post-operative infection.

Suprapubic drainage should be avoided if at all possible, since the small intestine will almost inevitably come in contact with the drain and form undesirable adhesions. Almost invariably the pelvis can be drained through a stab incision far over to the right as previously suggested.

An objection has been offered to the ligature method that the ligature may be "blown off" by accumulation of gas in the bowel. I have never had such an accident, and I note that Horsley,[3] in discussing the matter, ridicules the suggestion, stating that it is "much less likely to happen on the stump of the appendix than on a blood-vessel. The stump of the appendix is soft and succulent tissue and the ligature sinks in well. Intracæcal pressure never even approximates the blood-pressure, so that if any surgeon is capable of ligating a large blood-vessel he should surely be able successfully to tie the stump of the appendix." In support of this statement by Horsley is the personal communication by Doctor Seelig that on several occasions he had taken at autopsy a fresh colon, ligated the appendix as in an appendectomy and then applied pressure with a force pump, with the uniform result that the colon always burst at its thinnest point but "there never was any strain on the ligature around the appendix." It would seem self-evident, however, that a ligature tied into the *crushed*, and hence devitalized and infected, base of the appendix, as by the technic of some operators, might readily result in disaster, especially when buried in an incubation chamber by the purse-string suture.

As years have gone by I have in a good many cases had to re-open the abdomen for ovarian tumor, fibroids, gall-stones, *etc.*, in patients from whom I had previously removed the appendix. I have always made it a point to examine the field of my former operation, but in no instance have I found more than the slightest of adhesions, if any, and have never had a single case in which resulting adhesions had produced ileus or, indeed, any noticeable complication whatever. *This absence of adhesions has been in marked contrast to what was almost invariably found in cases in which at the previous operation the purse-string had been used.*

In 1904, Major G. Seelig,[14] of St. Louis, published an article condemning the purse-string operation and urging upon surgeons the advantages of the much simpler procedure. Other prominent surgeons have practiced and urged the procedure described by him, but investigations seem to show that for some reason, perhaps the *vis inertiæ* of egoism, the more complicated operation is still widely practiced notwithstanding its evident large morbidity and mortality.

Aside from legislative requirements and improved technic, as suggested herein, satisfactory appendicitis statistics cannot be hoped for until we secure earlier operations through earlier diagnosis, perhaps along the lines suggested by Bastianelli,[15] who, about ten years ago, put his "creed" into three aphorisms: "(*a*) When physicians are discussing whether the case is ap-

pendicitis or not: it *is*. (*b*) When they are inclined to admit the possibility of appendicitis without being perfectly sure of it: it not only is, but it is about to perforate. (*c*) When the diagnosis is sure, there is already perforation, with a more or less circumscribed peritonitis."

The advantages of the simple ligation treatment are: (1) A minimum of time; (2) a minimum of manipulation of the cæcum; (3) no penetration of bowel, with its 88 per cent. of infection (Roeder); (4) no possibility of a hæmatoma; (5) no possibility of devitalizing the wall of the cæcum; (7) an absolute minimum of fæcal fistula; (8) no incubation chamber for the encouragement of abscess.

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